بسم الله الرحمن الرحيم

جامعة آل البيت

College of Science
Department of Mathematics
Course syllabus: Time series
First semester 2020/2021

1. Instructor Information:

Instructor Name	Prof. Ali Handam	
Office Hours	Sunday ,Tuesday, Thursday	
Office Number and Telephone Extension		
Email	alifirstsem@gmail.com	

2. Course Description:

The course provides an accessible introduction to the application of time series methods. Topics covered include an introduction to the dynamic properties of time series, stochastic difference equations, stationary univariate models, forecast evaluation, state-space models, non-stationary models and unit roots, vector autoregression models, structural vector autoregression models, Bayesian vector autoregression models, dynamic factor models and factor augmented vector autoregression model.

3. Course Information:

Course number: 401438	Course Title: Linear programming	Level : Fourth year
Course Nature: Applied	Prerequisite: 0401331	Lecture time: Sun. Tue. Thu. 8:00 – 9:00
Academic year: 2020 – 2021	Semester: First	Credit Hours: 3

4. Course Objectives:

1)Learn basic analysis of time series data
2) learn basic concepts in time series regression
3) learn auto-regressive models
4) Learn averaging models

5. Intended Student Learning Outcomes:

After the course, the student is familiar with
 (1) the concept of a weakly and a strongly stationary process.
 (2) a sufficient condition for stationarity of an ARMA process.
 (3) how to built an ARMA model for time series data, how to estimate the parameters, test hypotheses, and forecast with the estimated ARMA model.
 (4) how to estimate the parameters, test hypotheses, and forecast conditional variance with the estimated ARMA model.

6. Course Content:

Course Content		
Week	**Topics**	
1+2	Objectives of time series analysis, types of time series,	
3+4	Forecasting	
5+6	Time series components	
7+8	Linear trend, quadratic trend, moving averages	
9+10+11	Stationary	
12+13	Static and Dynamic models	
14+15	ARMA Models	

7. Teaching and learning Strategies and Evaluation Methods:

Learning Outcomes	Teaching Strategies	learning Strategies	Evaluation Methods
The concept of a weakly and a strongly stationary process.	- Writing on the blackboard - Ask students questions and discuss them - Solve various issues	Give homework assignments	- Classroom presentations - Discussion - First exam
A sufficient condition for stationarity of an ARMA process.	- Writing on the blackboard - Ask students questions and discuss them - Solve various issues	Give homework assignments	- Classroom presentations - Discussion - Second exam
How to built an ARMA model for time series data, how to estimate the parameters, test hypotheses, and forecast with the estimated ARMA model.	- Writing on the blackboard - Ask students questions and discuss them - Solve various issues	Give homework assignments	
How to estimate the parameters, test hypotheses, and forecast conditional variance with the estimated ARMA model.	- Writing on the blackboard - Ask students questions and discuss them - Solve various issues	Give homework assignments	- Classroom presentations - Discussion - Final exam

8. Text Book:

The main reference	Introduction to time series and forecasting
Author(s)	Peter Brockwell and Richard Davis
Publisher	Springer
Year	2016
The edition	Third edition
The reference website	**https://drive.google.com/file/d/1jm3swTodpnEux1KX0KTc-hK-Gul07Y54/view?usp=sharing**

9. References and additional resources:

1)	مقدمة في التحليل الحديث للسلاسل الزمنية تأليف سمير مصطفى شعراوي، الطبعة الأولى ، 2005
2)	Introduction to time series analysis and forecasting, Douglas Montgomery, Cheryl Jennings and Murat Kulahci, Wiley, 2015.